भारतीय मानक
Indian Standard

IS 17585 : 2021

गुरुत्व प्रकार की प्रधावन टंकियों के लिए बीटा (उत्प्रवाह) वाल्व — विशिष्टि

Beta (Outflow) Valves for Gravity Type Flushing Cisterns — Specification

ICS 23.060.01; 91.140.70

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Sanitary Appliances and Water Fittings Sectional Committee, CED 03

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Sanitary Appliances and Water Fittings Sectional Committee had been approved by the Civil Engineering Divisional Council.

This standard has been formulated to cover dual flush beta (outflow) valves for fitting in flushing cisterns as per IS 774 : 2021 'Ceramic (vitreous China) flushing cisterns for water closets and urinals — Specification (*sixth revision*)' and IS 7231 : 2021 'Plastic flushing cistern for water closets and urinals — Specification (*third revision*)'. Beta (outflow) valve of the same construction can be fitted in the cisterns of either 6.0/3.0 litres, 4.8/2.8 litres or 4.0/2.0 litres capacity with suitable adjustment. Necessary adjustment in the beta valve to ensure its compatibility with the particular cistern discharge capacity is made by the manufacturer as per the requirement of the customer.

The composition of the Committee responsible for formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding of numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BETA (OUTFLOW) VALVES FOR GRAVITY TYPE FLUSHING CISTERNS — SPECIFICATION

1 SCOPE

This standard covers requirements for dual flush beta (outflow) valve suitable for fitting in gravity type flushing cisterns as per IS 774 and IS 7231.

2 REFERENCES

The standards given below contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
774 : 2021	Ceramic (vitreous China) flushing cisterns for water closets and urinals — Specification (*sixth revision*)
2267 : 1995	Polystyrene moulding and extrusion materials — Specification (*second revision*)
4905 : 2015/ ISO 24153 : 2009	Random sampling and randomization procedures (*first revision*)
7231 : 2021	Plastic flushing cistern for water closets and urinals — Specification (*third revision*)
7328 : 2020	Specification for polyethylene material for moulding and extrusion (*third revision*)
12234 : 2021	Plastic equilibrium float valves for cold water services — Specification (*first revision*)

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Dual Flush Device — A device that allows the user to flush the water closet with either a reduced or full volume of water.

NOTE — This device enables the user to cause a reduced flush of partial discharge when only urine is to be flushed away instead of the customary full flush.

3.2 Beta (Outflow) Valve — A dual flush device used to discharge the water from the water reservoir/cistern into a water closet.

3.3 Flow Rate — The volume of water discharged in 1 s after flushing operation, expressed in *l*/s.

4 GENERAL REQUIREMENTS

4.1 Construction and Material

4.1.1 *Construction*

The height, *A* of beta (outflow) valve varies according to the size of cistern and shall be agreed between manufacturer and customer (that is, cistern manufacturer). The recommended heights of beta valve are 150, 175, 190, 265 or 280 mm. The outlet diameter of beta valves, *B* shall be 47.5 mm or 59 mm or 62 mm or 65 mm with a tolerance of ± 1 mm, according to the diameter of the cistern outlet. The typical internal construction of beta valve is shown in Fig. 1.

4.1.2 *Material*

The beta outflow valve shall be manufactured using any of the materials given in Table 1.

Table 1 Materials for Manufacturing Beta Valve

(*Clause* 4.1.2)

Sl No.	Material	Conforming to
(1)	(2)	(3)
i)	High density polyethylene (HDPE)	IS 7328
ii)	Polystyrene, high impact	IS 2267
iii)	Polypropylene	–
iv)	Acrylonitrile-butadiene-styrene (ABS)	–
v)	Polyoxymethylene (POM)	–

NOTE — Wherever the relevant Indian Standard for any material is not specified, these shall be as agreed to between the manufacturer and the purchaser.

4.2 Compatibility with Water Closet Components

The rate of flow of the beta (outflow) valve shall be related to the specific cistern profile. The manufacturer shall supply the beta (outflow) valve with all the necessary adjustments/structural changes so as to ensure its compatibility with the specific cistern profile/discharge capacity, requirement of which shall be provided by the purchaser.

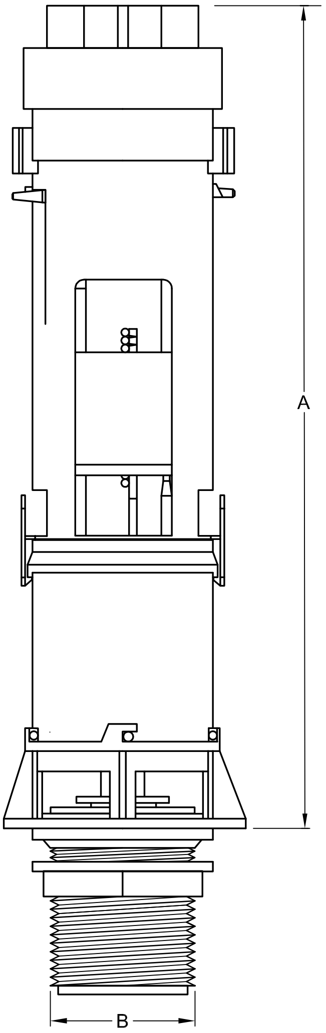

FIG. 1 TYPICAL INTERNAL CONSTRUCTION OF BETA (OUTFLOW) VALVE

4.3 Functional Operation

Beta (outflow) valve shall be able to fit within the flushing cistern with free movement of all parts. The user shall be required to activate the function of the valve by activation of the selector control and release. The selected flushing mode shall be completed without requiring further action or second operation. In order to verify the above, the beta valve shall be installed in the specific cistern in accordance with the manufacturer's installation instructions. The full and reduced push buttons of the dual flush cistern shall be independently operated to evaluate freedom of parts.

5 PERFORMANCE REQUIREMENTS

5.1 Flushing Flow Rate

When tested in accordance with the procedure given in **5.1.1**, the flow rate for valve seat of 47.5 mm diameter and for those having diameters more than 47.5 mm shall not be less than 1.50 *l*/s and 1.67 *l*/s, respectively, for full flush and reduced flush. The beta valves for use in water efficient flushing cisterns shall have a flow rate of not less than 1.85 *l*/s for full flush and reduced flush.

5.1.1 The flushing cistern shall be installed along with inlet valve conforming to IS 12234 and beta valve. The incoming water pressure shall not be less than 0.1 MPa. The cistern shall be filled with 6 *l* water and flushing operation of full flush shall be started. The discharged water shall be collected in a vessel and the time taken for discharge shall be recorded in s. The flushing flow rate shall be calculated as follows:

$$\text{Flushing flow rate (in } l\text{/s)} = \frac{\text{Volume of water collected, in } l}{\text{Time taken for discharge, in s}}$$

Three operations as above shall be carried out for full flush, and the flow rates shall be recorded. The average of the three flushing flow rates shall be calculated and reported as full flush flow rate.

Similarly, the flushing with reduced flush operating mechanism shall be carried out three times, and the flow rates shall be recorded. The average of the three flushing flow rates shall be calculated and reported as reduced flush flow rate.

5.2 Leakage Test

The beta (outflow) valve (supplied with cistern) shall be installed according to manufacturer's instruction and tested along with water closet and shall be flushed for 10 operations. There should not be any leakage through water closet and the connected cistern.

5.3 Endurance Test

5.3.1 The beta (outflow) valve shall be installed in a cistern having a steady supply of water. This valve shall be fitted in the cistern according to manufacturer's installation instruction and tested in accordance with **5.3.2** for 50 000 cycles each of both full and reduced flush. After the completion of the test, the beta valve and activation mechanism shall not show any deterioration that could affect performance.

This is a type test and shall be conducted whenever there are changes in the design, construction, materials or manufacturing process. Even if no change is envisaged, this test shall be done once in a year.

5.3.2 *Test Method*

5.3.2.1 *Apparatus*

A test equipment with pneumatic cylinders, capable of actuating reduced flush and full flush one after other continuously shall be used (*see* Fig. 2). The equipment needs a compressed air supply of 0.2 MPa to 0.3 MPa pressure and preferably the inlet supply air passes through a FRL (filter, regulator, lubricant)

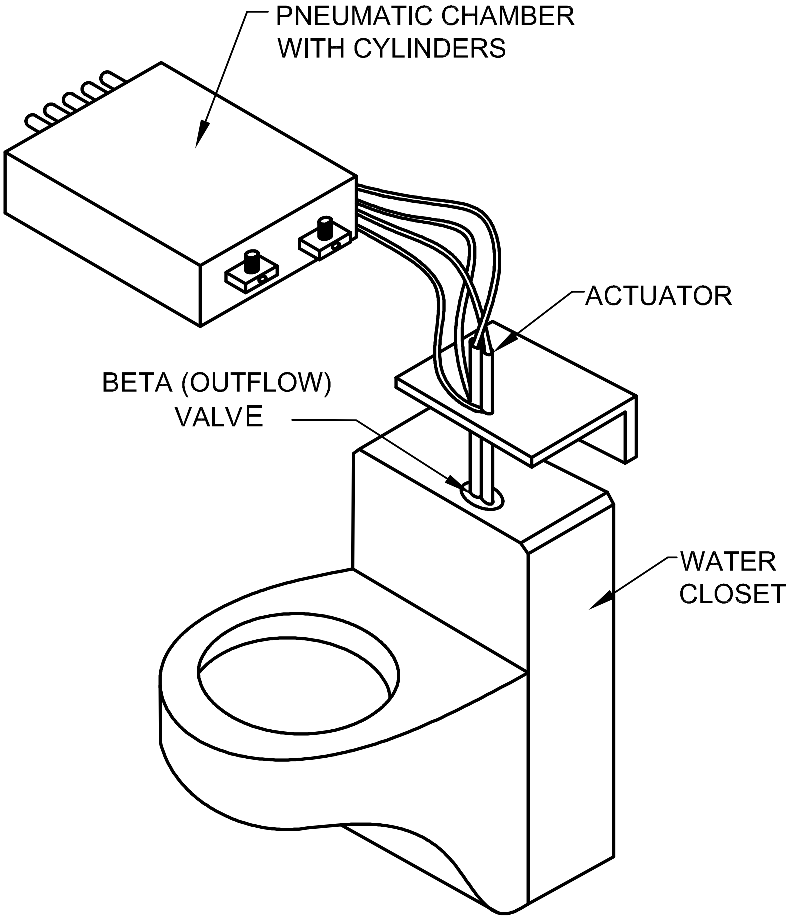

FIG. 2 Arrangement for Endurance Test

unit before it enters the test equipment. The equipment shall be incorporated with a numerical cycle counter.

The water supply arrangement shall be capable of supplying water at a pressure not less than 0.3 MPa.

5.3.2.2 *Procedure*

A sample of beta (outflow) valve picked at random from production shall be first checked for conformity to general requirement, functional operation and performance requirements.

Install the beta outflow valve sample on test equipment/water closet and start operating the mechanism.

Perform and note first two discharges of each reduced flush and full flush.

Set the equipment in auto-cycle mode and continue testing for 50 000 cycles each for both reduced and full flush. Monitor the cycle visually once in an hour and make a note of the reading as per the automated cyclecounter and check if the valve is functioning properly.

After completion of 50 000 cycles of both reduced flush and full flush, perform and note two discharges of each reduced flush and full flush again to check if the results are satisfactory and meeting the specification.

After this test, the beta (outflow) valve shall not show any damage or defects and all the parts shall function satisfactory.

6 SAMPLING AND CRITERIA FOR CONFORMITY

The sampling procedure and criteria for conformity of a lot to the requirements of this standard shall be as specified in Annex A.

7 MARKING

7.1 Each beta (outflow) valve shall be indelibly and legibly marked with the manufacturer’s name or trade-mark on the body of the valve. The following information about the beta (outflow) valve shall be marked on a sticker to be attached to it:

a) Outlet diameter,

b) Flushing flow rate, and

c) Batch number and date of manufacturing.

7.2 BIS Certification Marking

Each beta (outflow) valve conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations framed thereunder, and the beta (outflow) valve may be marked with the Standard Mark.

ANNEX A

(*Clause* 6)

SAMPLING AND CRITERIA FOR CONFORMITY

A-1 SAMPLING

A-1.1 Lot

In any consignment, all the beta (outflow) valves made of the same type, material, of the same construction, flow rate and discharge capacity and from the same batch of manufacture shall be grouped together to constitute a lot.

A-1.1.1 Samples shall be selected and tested from each lot separately to determine conformity of the lot to the requirements of this standard.

A-1.2 The number of beta (outflow) valves to be selected from a lot shall depend upon the size of the lot and shall be in accordance with col 2 and col 3 of Table 1.

A-1.3 The beta (outflow) valves for the sample shall be selected at random from the lot. For ensuring randomness of selection, procedures given in IS 4905 may be followed.

A-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

A-2.1 All the valves selected according to col 2 and 3 of Table 1 shall be examined for material and construction. Any valve failing in one or more of these requirements shall be considered as defective.

Table 1 Sample Size and Criteria for Conformity

(*Clauses* A-1.2, A-2.1, A-2.2, *and* A-2.3.1)

Sl No. (1)	Lot Size (2)	Sample Size (3)	Acceptance Number (4)
i)	Up to 100	5	0
ii)	101 to 150	8	0
iii)	151 to 500	13	1
iv)	501 to 1 000	20	1
v)	1 001 to above	32	2

A-2.2 The lot shall be considered as conforming to these requirements if the number of defective items found in the sample is less than or equal to the corresponding acceptance number given in col 4 of Table 1.

A-2.3 The lot having satisfied the requirements given in **A-2.1** shall be further tested for flushing flow rate test **(5.1)** and leakage test **(5.2)**.

A-2.3.1 For this purpose, the number of valves given in col 3 of Table 1 shall be tested.

A-2.4 The lot shall be considered to have satisfied the requirements for flow rate and leakage test if none of the sample fails in these requirements.

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Sanitary Appliances and Water Fittings Sectional Committee, CED 03

Organization	*Representative(s)*
Municipal Corporation of Greater Mumbai, Mumbai	Hydraulic Engineer (Shri A. S. Rathore) (***Chairman***)
Brihan Mumbai Licensed Plumbers' Association, Mumbai	Shri Kishor V. Merchant Shri Bijal M. Shah (*Alternate*)
Building Materials and Technology Promotion Council, New Delhi	Shri S. K. Gupta Shri C. N. Jha (*Alternate*)
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Delhi Jal Board, New Delhi	Chief Engineer (WW) II Superintending Engineer (NW) (*Alternate*)
Engineers India Ltd, New Delhi	Shri Samir Das Shri Rajesh Gujral (*Alternate* I) Shri Anish Mahala (*Alternate* II)
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